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Probing neutrino magnetic moment at the Jinping neutrino experiment

Neutrino magnetic moment (νMM) is an important property of massive neutrinos.
The recent anomalous excess at few keV electronic recoils observed by the XENON1T collaboration might indicate a $\sim 2.2 \times 10^{-11}\mu_B$ effective neutrino magnetic moment (μ_ν^{eff}) from solar neutrinos.
Therefore, it is essential to carry out the νMM searches at a different experiment to confirm or exclude such a hypothesis.
We study the feasibility of doing νMM measurement with 4 kton active mass at Jinping neutrino experiment (Jinping) using electron recoil data from both natural and artificial neutrino sources.
The sensitivity of μ_ν^{eff} can reach $< 1.2 \times 10^{-11}\mu_B$ at 90\% C.L. with 10-year data taking of solar neutrinos.
Besides the abundance of the intrinsic low energy background ^{14}C and ^{85}Kr in the liquid scintillator, we find the sensitivity to νMM is highly correlated with the systematic uncertainties of *pp* and ^{85}Kr.
Reducing systematic uncertainties (*pp* and ^{85}Kr) and the intrinsic background (^{14}C and ^{85}Kr)
can help to improve sensitivities below these levels and reach the region of astrophysical interest.
With a 3 mega-Curie (MCi) artificial neutrino source ^{51}Cr installed at Jinping neutrino detector for 55 days, it could give us a sensitivity to the electron neutrino magnetic moment (μ_{ν_e}) with $< 1.1 \times 10^{-11}\mu_B$ at 90\% C.L..
With the combination of those two measurements, the flavor structure of the neutrino magnetic moment can be also probed at Jinping.

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